OROVILLE FACILITIES RELICENSING
(FERC PROJECT NO. 2100)

INTERIM REPORT
SP-T1

EFFECTS OF PROJECT OPERATIONS AND FEATURES ON WILDLIFE AND WILDLIFE HABITAT

REVIEW DRAFT

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Table of Contents

Oroville Facilities Relicensing
Federal Energy Regulatory Commission Project No. 2100
Interim Report SP-T1: Effects of Project Operations and Features on Wildlife and Wildlife Habitat
February 2003

Summary

Water Level Fluctuations-Lake Oroville

- Survey data indicate low wildlife use of the reservoir drawdown zone
- No loss of eggs, young, or sedentary species observed associated with reservoir infilling
- Potential reservoir drawdown affects on piscivorous birds

Water Level Fluctuations-Diversion Pool, Thermalito Forebay, and Thermalito Afterbay

- Stable water surface elevations observed at Diversion Pool and Thermalito Forebay
- Afterbay water level fluctuations generally between 127 feet and 135 feet.
- 900 acres of wetland along Afterbay margin
- Highly diverse wildlife assemblage at Afterbay compared to other project reservoirs
- Afterbay water level fluctuations a factor in habitat diversity and wildlife species diversity
- Afterbay water level fluctuations can cause adverse affects to some life stages of some species including nesting and brooding waterfowl
- Waterfowl brood ponds developed to minimize effects of water level fluctuations on brooding waterfowl
- Afterbay water level fluctuations during the 2002 breeding season resulted in substantial losses of mallard eggs within the 900 acre wetland margin.
- 2003 Afterbay water level fluctuations and waterfowl nesting surveys

Feather River Flow Fluctuations

- Ongoing evaluation of operational affects on establishment and maintenance or riparian vegetation and river geomorphology
- High wildlife species diversity in Feather River riparian and riverine habitats
- Preliminary data indicate that spring pulse flows may be an important factor in riparian vegetation establishment. Preliminary data further suggest that periodic high flow events may be required to maintain geomorphic processes.

Gravel Harvest

- Unvegetated dredger tailings occupy approximately 600 acres within the OWA

- These tailings provide poor wildlife habitat and represent a barrier to dispersal or movement for some species
- These tailings provided a source of gravel for project construction and a continuing source of material for project maintenance
- Large scale commercial gravel harvest also occurs within OWA through a mining lease under the jurisdiction of DWR
- Potential wildlife impacts associated with gravel extraction and transportation include noise, dust, disturbance, direct mortality, and habitat modification/loss
- Carefully designed and implemented commercial gravel harvest may be the most effective large scale, long-term habitat improvement tool

Project Related Maintenance Activities

- **Road, Trail, Parking Lot Maintenance**
  - Paving, grading, herbicides, mechanical vegetative removal
  - Potential ESA conflicts
  - Opportunities for enhancement
- **Bridge Maintenance**
  - Repainting, redecking, safety inspections
  - Potential impacts to wildlife including ESA species
- **Pesticide Use**
  - Vertebrate pest control
  - Invertebrate pest control
  - Herbicide use
  - ESA Issues
- **Transmission Line Right-of-Way**
  - 11.3 miles under license -Hyatt Powerplant to Table Mountain Substation (9 miles) and Thermalito Powerplant to Table Mountain Substation (2.3 miles)
  - Annual mechanical pruning to maintain 30 foot clearance
  - ESA Issues

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Study plan T1 calls for consolidation of the results of the other wildlife related study plans into the final report. However, this interim report will focus on the results of evaluations related specifically to changes in wildlife occurrences and wildlife habitat due to project operations and maintenance activities. Specific operations or maintenance activities covered under this report include water level fluctuations, Feather River flow fluctuations, gravel harvest, and maintenance practices implemented by the land management agencies within the project area. The principal land management agency's conducting project-related maintenance activities within the project area include the California Department of Water Resources (DWR), California Department of Fish and Game (DFG), and the California Department of Parks and Recreation (DPR).

Water Level Fluctuations-Lake Oroville

The annual water level fluctuations within the drawdown zone of Lake Oroville result from various natural precipitation/runoff events and project operations for water supply, hydropower generation, and flood control. This annual cycle involves increasing lake levels from November through May or June in most years followed by gradual decreasing water levels until the initiation of fall precipitation and runoff. These water level fluctuations create a harsh environment for establishment of plant cover within the drawdown zone. Loss of soil to wave action, periodic inundation; followed by severe desiccation have resulted in a generally barren drawdown zone. Past attempts to revegetate portions of the drawdown zone have generally been unsuccessful without first year summer irrigation. DWR experimented with establishment of woody cover species within the drawdown zone during the 1980s for warmwater fisheries enhancement. Many of the willows (*Salix sp.)* and buttonbush *(Cephalanthus occidentalis)* planted in these experimental plots have survived for over 14 years (Jerry Boles, DWR pers. comm.). A multi-agency/stakeholder group experimented with spring hydroseeding of suitable areas within the drawdown zone to establish herbaceous cover species for aesthetics, wildlife habitat, and warmwater fisheries improvement during the early 1980s. These efforts were unsuccessful. However, subsequent analyses have indicated that hydroseeding timing and seed mix may have been less than optimal.

Lack of vegetative cover within the drawdown zone severely limits wildlife use of this area. Thirty-six wildlife species have been detected during field surveys within the drawdown zone including acorn woodpecker, American white pelican, bald eagle, barn swallow, belted kingfisher, black bear, black phoebe, California ground squirrel, California gull, Canada goose, canyon wren, American crow,

American dipper, black-tailed deer, common merganser, double-crested cormorant, European starling, great egret, great-blue heron, greater yellowlegs, killdeer, mallard, northern rough-winged swallow, osprey, raccoon, ring-billed gull, rock dove, snowy egret, spotted sandpiper, tree swallow, turkey vulture, western aquatic garter snake, western fence lizard, western meadowlark, and white-fronted goose. Several of these species may utilize habitats within the drawdown zone for reproduction including belted kingfisher, Canada goose, canyon wren, American dipper, killdeer, mallard, common merganser, and northern rough-winged swallow.

Rapid winter/spring inflow into the reservoir could potentially result in direct mortality of some sedentary wildlife species or life stages within the drawdown zone of the reservoir. Rapidly rising reservoir levels and associated potential wildlife impacts are most likely to occur during years of high reservoir drawdown and within the confined canyons portions of the upper reservoir arms. Due to the physical topography of the reservoir, the lower the lake level, the more rapid the water level rises at any given inflow. The period of reproduction for many of the wildlife species using the drawdown zone overlaps with the period of reservoir infilling. Nests, eggs, or young of these species could be impacted by rapidly rising water levels just as they would be in upstream unregulated riverine habitat. However, the extent of these wildlife losses would be substantially less under these natural flow events within the reservoir drawdown zone as lower densities of far fewer species utilize the barren drawdown zone. Successful reproduction by small numbers of mallard, Canada goose, common merganser and northern-rough-winged swallow were observed within the drawdown zone of Lake Oroville during 2002 surveys.

As reservoir levels drop, energy expenditures increase for piscivorous birds including the osprey, bald eagle, herons, egrets, belted kingfisher, and double-crested cormorants. These species must travel greater distances to forage and contend with greater vertical and horizontal distances when returning fish to the nest. Further, species like bald eagle and osprey must increasingly forage on the wing as opposed to a perch as reservoir levels recede from the high water mark. Fairly extensive warm water fisheries habitat improvement has been conducted within the upper levels of the reservoir drawdown zone. These cover enhancements tend to concentrate fish of several size classes and are attractive foraging locations for piscivorous birds. Placement of the warmwater fisheries habitat structure in the vicinity of bald eagle and osprey nest territories could improve production and survival of nestling for these and other piscivorous bird species.

Water Level Fluctuations-Diversion Pool, Thermalito Forebay and Thermalito Afterbay

Water level fluctuations are severely limited in the Thermalito Forebay and within the Diversion Pool. Water level fluctuations occur on a weekly basis within the

Thermalito Afterbay. These elevations generally range between 127 and 135 feet above mean sea level. Gentle gradient, routine inundation, and relatively minor water level fluctuations have resulted in the establishment of over 900 acres of wetland habitat along the north and east edges of the Afterbay.

In contrast to the Lake Oroville, the drawdown zone of the Afterbay supports rich wildlife assemblages and a high degree of habitat diversity. Further, operational water level fluctuations provide habitats generally absent from other project facilities with more constant water level fluctuations. Survey data indicate that exposed mudflats seasonally provide habitat for a variety of migratory shorebirds including the American pipit, black-necked stilt, black tern, California gull, Caspian tern, Forster's tern, greater yellowlegs, least sandpiper, long-billed dowitcher, ring-billed gull, semipalmated sandpiper, spotted sandpiper, and white-faced ibis.

Other wading birds and other waterfowl were also documented to utilize the mudflats as well as shallow flooded areas. These species include the American bittern, American coot, American white pelican, American widgeon, black-crowned night heron, bufflehead, Canada goose, canvasback, cattle egret, cinnamon teal, common goldeneye, common merganser, common moorhen, eared grebe, gadwall, great egret, great-blue heron, greater scaup, green heron, horned grebe, lesser scaulp, mallard, northern pintail, northern shoveler, pied-billed grebe, redhead, ring-necked duck, ruddy duck, snowy egret, tundra swan, white-fronted goose, and wood duck.

Additional species observed within the wetland margin of the Afterbay include the barn swallow, black phoebe, black-shouldered kite, black-tailed jackrabbit, Brewer's blackbird, brown-headed cowbird, bullfrog, common garter snake, common yellowthroat, cottontail, gopher snake, long-billed marsh wren, northern harrier, northern rough-winged swallow, pacific chorus frog, racer, raccoon, red-winged blackbird, ring-necked pheasant, short-eared owl, striped skunk, tree swallow, Virginia opossum, violet-green swallow, and western aquatic garter snake.

The wildlife habitats created by construction and operation of the Afterbay have resulted in one of the most diverse wildlife assemblages within the project area. However, for some life stages of some species (primarily brooding waterfowl) the water level fluctuations at the Afterbay can adversely impact production and survival through decreased cover and subsequent increased predation.

DWR, DFG, California Waterfowl Association and other stakeholders constructed six waterfowl brood ponds in and around the Afterbay during the last 15 years. These waterfowl brood ponds are not subject to Afterbay water level fluctuations and were constructed to improve waterfowl brooding habitat by providing a consistent water surface elevation with adjacent vegetative cover.

These ponds are designed to be recharged directly from the Afterbay. Project operations have been modified in consultation with stakeholders during most years to accommodate recharge of the brood ponds during the waterfowl-breeding season (March 15 to May 15) at a regular interval. Brood pond recharge is accomplished by raising the Afterbay water level to a minimum water surface elevation of 134.1 feet.

A field planning session was held between DWR operations and environmental staff, CWA, and DFG prior to the 2002 waterfowl nesting season. This field session lead to a consensus concerning spring 2002 Afterbay water level fluctuations during the waterfowl nesting and brooding seasons. The consensus basically identified the frequency and water surface elevation required to recharge and maintain the brood ponds. It was noted during the planning session that high water levels (either operational or for brood pond recharge) could flood potential waterfowl nesting habitat along the Afterbay margin during the nesting season.

Sudden or periodic increases in water levels within the Afterbay have the potential to adversely affect a wide variety of wildlife species by flooding the majority of the 900 acres of wetland habitat around the Afterbay. This flooding serves to temporarily displace wildlife. Further, this periodic flooding can result in direct mortality of some life stages of certain species. In particular, spring high water levels have occasionally been observed to flood waterfowl nests, resulting in loss of eggs. The extent or significance of these losses was unknown. In an effort to evaluate this issue, DWR staff conducted waterfowl nest surveys in various habitats around the Thermalito Afterbay during mid to late April 2002. These studies were designed to provide preliminary data, which may be used to evaluate the significance of any impacts, refine future studies, or aide in the development of potential PM&E measures.

2002 Waterfowl Nesting Survey

Hypothesis-High quality nesting cover and proximity to brood water will result in higher waterfowl nesting in the inundation area than in adjacent upland habitats.

Survey Methods-To assess the impact of potential inundation on nesting waterfowl, data was collected and compared from upland and wetland habitats around the Afterbay. Eight 3.2-acre circular plots were established in areas subject to periodic inundation through project operations during late April 2002. These plots were placed adjacent to the Thermalito Afterbay in areas influenced by inundation or high ground water levels and supporting wetland vegetation including Juncus, Scirpus, Salix, Typha, and Verbena. An additional eight 3.2-acre circular plots were established in upland habitat adjacent to these wetland habitats.

Nest locations were detected by dragging a 1-inch diameter cotton rope around central point. The movement of the rope through the vegetation flushes nesting hens from the nest allowing the surveyors to identify and map nest locations. This method does not allow assessment of predated nests where the hen is no longer present. Once flushed, nesting hens will return to the nest after the survey is completed. In each sampled plot the number of nests and number of eggs per nest was recorded.

To check the ability of this method to detect nesting waterfowl, intensive nest searches were conducted at four of the sixteen sampling locations. These searches involved two observers walking the entire plot on a 10-yard grid pattern to visually detect any missed nests or flush any nesting hens. Detailed vegetation sampling was not conducted as a part of this evaluation; however dominant species and ocular estimates of plant cover were noted during the surveys.

Results and Discussion-No additional nests were detected using the 10-yard grid search of the four 3.2-acre plots resurveyed using this method.

Four nests were located in the 25.6-acres of upland habitat surveyed for a density of 0.16 nests per acre. An unknown predator had destroyed one of these nests. This density of nesting is significantly less than those documented by previous studies in food/cover plantings near brood ponds at the Afterbay which identified mallard nesting densities greater than 3 nests/acre (Don Anthrop pers. comm.). Mallard was the only species found to nest in the area sampled and averaged 6.5 eggs per nest.

Vegetation in the upland plots varied in density and height, but was generally of low to moderate density and less than 12 inches in height. However, individual bunchgrass plants up to 4 feet in height occurred on some plots. No star thistle was evident. Star thistle growth phenology is such that most growth occurs after the first mallard hatch.

Seven mallard nests were located within the 25.6-acre area of wetland habitat surveyed for an average density of 0.28 nests per acre. This density of nesting is approximately 75 percent greater than that found in adjacent upland areas. However, 0.28 nests per acre are substantially less than that documented for upland cover enhancements. Average number of eggs per nest was 9.5.

The amount of area in each wetland plot was estimated visually and recorded into one of three vegetation classes including:

- Emergent Wetland (54.4 %) Juncus, Scirpus, and Typha-typical of saturated soil conditions
- Transitional Vegetation (38.7 %) Verbena-indicator of elevated water table but not anoxic soil conditions

- Upland Species (6.8 %) wild oats, vetch, bunchgrasses-not affected by inundation or high water table

One mallard nest was located in emergent wetland vegetation. Six nests were located in transitional vegetation and none were identified in upland habitats. These data indicate that mallards appear to be selecting transitional vegetation for nesting over emergent or more upland types. Subsequent site visits indicated that virtually all emergent wetland and transitional vegetation areas were inundated due to Thermalito Afterbay fluctuations during incubation and that substantial losses of waterfowl eggs occurred.

Two possible operations alternatives of Thermalito Afterbay could serve to significantly reduce nesting losses due to flooding from mid-March through mid-May.

- Maintain a relatively constant water level during the prime waterfowl-nesting period (March 15 to May 15).
- Raise the water level in the in the Afterbay to a high level every 9 days during this period. Hen mallards take approximately 10 to 12 days to construct a nest and initiate egg laying. Regular, periodic flooding would force hens to select nest sites and lay eggs above the fluctuating inundation zone.

This second potential operational alternative would force nesting hens to select nest locations in upland areas where nesting cover is generally not as dense or tall. Waterfowl nesting in upland areas devoid of adequate nesting cover may experience increased predation rates.

During spring 2003 DWR proposes to:

- Raise Afterbay levels on a weekly basis to an elevation of 133.5 feet from March 15 to May 15. This water surface elevation is intended to discourage waterfowl nesting within the fluctuating inundation zone of the Afterbay while allowing weekly recharge of waterfowl brood ponds.
- Monitor waterfowl nesting within wetland and upland habitats as well as any Afterbay upland cover enhancements developed by DFG.
- Report survey findings to the Environmental Work Group.

Emergencies or State Water Project operational constraints could preclude the above proposal.

Feather River Flow Fluctuations

Project related flow releases largely control Feather River flow above the Yuba River and provide a significant percentage of the flow at the mouth under most conditions. Project operations (primarily flood control) serve to limit the amount

of flow variability within the lower Feather River. Winter flows are significantly less than would occur in an uncontrolled watershed; while summer/fall flows are substantially greater. This reduced flow variability and the disruption of sediment movement by Oroville Dam serve to restrict natural geomorphic processes including erosion, deposition, and flooding. Further, river levees serve to restrict the floodplain, which further serves to limit channel meander and other natural geomorphic processes. All of these factors can serve to limit the establishment and maintenance of riparian habitat. Cottonwood-willow riparian habitat support more breeding avian species than any other comparable broad habitat type in California (Gaines 1977). Up to 250 species of amphibian, reptile, bird, or mammal may occur along the Feather River (DFG 2002). Relicensing study plans SP-G2 and SP-T3/5 are currently evaluating project effects on river geomorphology and riparian communities. The output from these study plans will be used as a basis for analyses of project effects on riparian wildlife. Preliminary data suggest that spring pulse flows may be a key element in the establishment and maintenance of riparian vegetation. Timing of these and any future spring/summer fisheries flows should be evaluated relative to potential impacts on nesting bank swallow, a State threatened species.

Gravel Harvest

The portion of the Oroville Wildlife Area (OWA) near the Feather River was historically subject to commercial dredger operations in the early 1900s. These activities resulted in significant disruption of the riparian habitat along the Feather River. Gravel/cobble piles exist on approximately 590 acres within the OWA. The free draining nature of these dredger tailings precludes the establishment of vegetation except in areas at elevations near the water table. These largely barren areas have been subject to gravel harvest during project construction and are a continuing source of gravel for project maintenance. Further, large scale, commercial gravel harvest activities currently occur within portions of the OWA through a mining lease under the jurisdiction of DWR.

Potential wildlife impacts associated with gravel extraction and transportation include noise, dust, disturbance, direct mortality, and habitat modification/loss along transportation roads. For these reasons and others, DFG has questioned the compatibility of commercial gravel harvest and wildlife management within a designated Wildlife Management Area. This issue has been elevated to the Oroville Facilities Relicensing, Land Use, Land Management and Aesthetics Work Group. However, DWR in cooperation with the California Department of Conservation (DOC), DFG and the commercial mining interest will continue to evaluate opportunities to minimize impacts to wildlife and wildlife habitat associated with gravel harvest within the OWA.

From a wildlife habitat perspective, carefully designed and implemented gravel harvest within the OWA may well be the only effective large-scale, long-term habitat improvement tool available to land managers. Large areas of exposed

dredger tailings provide habitat for few wildlife species and can act as a barrier to dispersal and movement of some species. Gravel extraction serves to remove larger material while retaining fine materials (sand and silt) necessary for vegetative establishment. Gravel harvest can also effectively decrease the distance to groundwater to levels suitable for vegetative establishment and maintenance. Carefully managed gravel harvest can in the long-term replace the existing 590 acres of relatively barren dredger tailings within the OWA with riparian, freshwater emergent wetland, and lacustrine habitat of high wildlife value. Further, gravel replenishment within the Feather River floodplain has the potential to improve fisheries habitat including recovery of State and federally "listed" salmon and steelhead.

Project Related Maintenance Activities

Project area land management agencies including DWR, DFG, and DPR conduct a wide variety of maintenance activities within the project area. Land Management agencies maintenance staff were interviewed to identify maintenance activities, locations, and timing. Some of these activities have the potential to directly affect wildlife species and wildlife habitat. Maintenance activities with the greatest potential to affect wildlife species or wildlife habitat are discussed below.

Road, Trail, and Parking Lot Maintenance - The amount and location of roads and parking areas within the project area is currently being assessed. Maintenance activities associated with roads and parking areas vary as to the type of base (dirt, gravel, paved). In general, road maintenance consists of maintaining the road base, controlling vegetation along roadsides, and cleaning ditches and culverts to insure drainage. Dirt and gravel road bases are primarily maintained by grading (spring and fall/winter). However, herbicide treatments are infrequently used to supplement grading in some locations. Paved road bases are repaved on approximately 10-year intervals. The amount of roadside vegetation treatment varies by type of road and use standard. Along high-speed roads mowing or herbicide is used on an annual basis to control herbaceous vegetation on the shoulder of the road and on trails. Further, along these roads woody vegetation is often mechanically removed to improve visibility and public safety.

Road maintenance activities have the potential to adversely affect federally listed vernal pool plant and animal species, as well as, the federally listed valley elderberry longhorn beetle (VELB). Habitat surveys indicate that approximately 80 percent of the vernal pools within the project area are associated with physical structures, primarily roads. Analyses of each of the 216 vernal pools within the project area identified some opportunities to improve road maintenance practices in areas containing vernal pools. Elderberry bushes, the primary habitat for the VELB, occur primarily along the Feather River below Oroville Dam. High elderberry densities are associated with levee roads within the portion of the

OWA along the Feather River. To avoid potential impacts, all elderberry bushes within 100 feet of roads and other project facilities are currently being mapped using GPS technology. These data/maps will allow maintenance staff to identify locations where herbicide treatment or woody vegetation removal would be restricted. Within the high-density areas of the OWA a road/levee maintenance plan will be developed which will include pre-maintenance surveys and environmental review requirements for all maintenance activities.

An evaluation of existing roads will be conducted under SP-T10 for the purpose of identifying unnecessary roads and other areas of habitat disturbances suitable for upland site restoration.

Bridge Maintenance - A large variety of bridges are present within the project area ranging from small wooden structures on trails to State Highway bridges. Maintenance activities associated with bridges primarily include safety inspection, repainting, and redecking.

Repainting has the greatest potential to impact wildlife. Larger bridges within the project area have the potential to support nesting sensitive raptors, cliff swallows, rock doves, house sparrows, barn owls, and up to 15 species of bats. Repainting large bridges generally occurs during the dry season (to limit discharge of hazardous material introduction into waters) and has the potential to disrupt wildlife reproduction. Historic practices to limit impacts include timing (sandblasting and repainting outside the reproductive season) and/or pre-project screening to exclude wildlife from work areas. Bridge inspection also has the potential to adversely impact nesting sensitive raptors by disturbance. Human disturbance can adversely affect nesting success by displacing incubating adults, or prefledged young from the nest site. Maintenance staff are notified of sensitive raptors nesting locations, sensitivity, and the breeding season (March through August) to prevent disturbance of nesting raptors.

Pesticide Use - Pesticides are one management tool used at several locations to control undesirable rodents, insects, and vegetation. Ground squirrel control is practiced by DWR along Afterbay levees using bait stations to limit non-target and secondary species poisoning. Neither DPR nor DFG conduct any vertebrate pest control employing chemicals on a regular basis. Butte County Mosquito Abatement Department and the City of Oroville annually treat substantial areas within the project area.

All three land management agencies utilize herbicides to control vegetation at specific locations for specific purposes including fuels management, noxious weed control, public safety, and to allow facilities inspection. Roadside spraying is the largest amount of area treated on an annual basis. However, the Thermalito Afterbay and Forebay levees are sprayed on an annual basis to facilitate structural integrity inspections. DPR spot treats noxious weeds along the Thermalito Forebay, while aerial spraying for purple loosestrife control is

conducted by DFG along portions of the Thermalito Afterbay margin. All three land management agencies have licensed pesticide applicators who fully comply with safety, application criteria, and reporting requirements.

The principal wildlife associated impacts related to pesticide use include potential impacts to vernal pool invertebrates and VELB. Both Thermalito Afterbay and Forebay levees and associated roads are located near vernal pools. Some purple loosestrife treatment areas and are also close to vernal pool habitats. Preliminary estimates indicate that thousands of elderberry stems are present within 100 feet of project roads within the portion of the OWA near the Feather River. Maps identifying the locations of all vernal pool habitats are being distributed to maintenance staff associated with DFG, DWR, CALTRANS, Butte County Mosquito Abatement, and DPR, which should allow avoidance of these sensitive habitats during maintenance activities. Location maps of elderberry locations are currently being prepared for review and reference by land management agency maintenance staff.

Transmission Line Right-of-Way - Approximately 11.3 miles of overhead transmission line are included in the project license and require regular trimming of trees to maintain vegetation clearances. These transmission lines include:

- The BUS line, a 230-kV overhead transmission line extending 9 miles from the Hyatt Powerplant Switchyard to PG&E's Table Mountain Substation.

- A 230-kV overhead transmission line that extends approximately 2.3 miles from the Thermalito Switchyard to PG&E's Table Mountain Substation.

The majority of the transmission line corridor is located in annual grassland habitats, which do not require vegetative treatment or other regular maintenance activity other than inspection. However, the BUS line crosses oak and foothill pine habitats between the Hyatt Switchyard and south Table Mountain. In keeping with the conditions of the existing license, DWR maintains woody vegetation within the transmission line corridor to reduce fire danger. Vegetative control includes pruning or topping trees within 30 feet of transmission lines using mechanical methods. Slash is piled to provide wildlife cover. A largely unmaintained access road/jeep trail is present along portions of the transmission line corridor.

Reduced habitat structural diversity in areas subject to mechanical treatment can influence wildlife species diversity, primarily avian species diversity that is strongly influenced by habitat structural diversity. Avian species requiring multi-storied stands or large snags may be adversely impacted within those portions of the transmission line corridor subject to woody vegetation management.

A small number of elderberry shrubs are present within the transmission line right-of-way. Although these shrubs do not reach a height which requires

topping, they could be impacted by removal of overstory, or mechanical damage associated with overstory removal. A complete survey of the transmission line corridor for the purpose of identifying elderberry locations and other sensitive resources including vernal pools is planned for spring/summer 2003.

At least three active osprey nests are present on transmission towers along the transmission line corridor. Two of the three active nests successfully produced young during the 2002 breeding season. These nest locations are near the transmission line crossing of the Diversion Pool. Mechanical treatment within this portion of the transmission line corridor should be scheduled outside the osprey nesting season (April through August). Further, any activities involving human access to the upper portions of these transmission line towers should be avoided during the osprey nesting season to limit disturbance during incubation or to pre-fledged young.

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